STATE OF NEW MEXICO
WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF PETITION TO AMEND SURFACE WATER QUALITY STANDARDS 20.6.4 NMAC

WQCC 14-05 (R)

New Mexico Environment Department,

Petitioner.

DIRECT TESTIMONY OF DEBORAH SARABIA

I. INTRODUCTION

My name is Deborah Sarabia. I am currently employed as an Environmental Scientist with the New Mexico Environment Department ("NMED"), Surface Water Quality Bureau ("SWQB"). I am presenting this written testimony on behalf of the Department concerning a proposal to amend the Surface Water Quality Standards. A copy of my resume is provided as SWQB Exhibit 47. It is accurate and up-to-date.

I will present testimony on two proposals for UAAs conducted by the SWQB. The first proposal concerns four ephemeral waters in the Pecos River basin, in the Tularosa Valley closed basin and the Mimbres closed basin. The SWQB determined through a Use Attainability Analysis ("UAA") based on the Hydrology Protocol ("HP") that these waters are ephemeral. The background and application of the HP-based UAA process has been described in previous testimony presented by Jodey Kougioulis (SWQB Exhibit 39). The second proposal is to change the designated aquatic life uses for the Animas River in New Mexico to coolwater. The proposed changes for the Animas River are supported by a UAA prepared by SWQB.

II. PROPOSALS

A. The first proposed revision adds four streams determined as ephemeral to Subsection C of 20.6.4.97 NMAC.

20.6.4.97 EPHEMERAL WATERS - Ephemeral unclassified surface waters of the state as identified below and additional ephemeral waters as identified on the department's water quality standards website pursuant to Subsection C of 20.6.4.15 NMAC.

A. Designated Uses: livestock watering, wildlife habitat, limited aquatic life and secondary contact.

B. Criteria: the use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses.

C. Waters:

(2) the following waters are designated in the **Pecos river basin**:

(b) Aqua Chiquita from Rio Peñasco upstream to McEwan canyon; and

(c) Grindstone canyon upstream of Grindstone Reservoir.

…

(6) the following waters are designated in the **closed basins**:

(a) in the Tularosa river closed basin San Andres canyon downstream of South San Andres canyon; and

(b) in the Mimbres river closed basin:

(i) San Vicente arroyo from the Mimbres river upstream to Maudes canyon;

B. The second revision proposes changes to the aquatic life use in two segments of the Animas River, and adds a segment specific temperature criterion to the upper Animas River segment.

20.6.4.403 SAN JUAN RIVER BASIN - The Animas river from its confluence with the San Juan river upstream to Estes Arroyo.

A. Designated Uses: public water supply, industrial water supply, irrigation, livestock watering, wildlife habitat, ~~marginal coldwater~~ coolwater aquatic life, and primary contact ~~and warmwater aquatic life~~.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses~~.~~, except that the following segment-specific criterion applies: temperature 29°C (84.2°F) or less.

[20.6.4.403 NMAC - Rp 20 NMAC 6.1.2403, 10-12-00; A, 05-23-05; A, 12-01-10; A, XX-XX-XX]

20.6.4.404 SAN JUAN RIVER BASIN - The Animas river from Estes Arroyo upstream to the ~~New Mexico-Colorado line~~ Southern Ute Indian tribal boundary.

A. Designated Uses: ~~coldwater~~coolwater aquatic life, irrigation, livestock watering, wildlife habitat, public water supply, industrial water supply and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: phosphorus (unfiltered sample) 0.l mg/L or less.

[20.6.4.404 NMAC - Rp 20 NMAC 6.1.2404, 10-12-00; A, 05-23-05; A, 12-01-10; A, XX-XX-XX]

III. BASES FOR PROPOSALS

A. Section 20.6.4.97 NMAC

The basis for the first proposed change to list four streams determined as ephemeral under 20.6.4.97 NMAC is the HP-based UAA in SWQB Exhibit 48. SWQB conducted an HP-based UAA for six streams historically observed as possibly ephemeral: Aqua Chiquita Creek from the Rio Peñasco to McEwan Canyon, Grindstone Canyon above Grindstone Reservoir, San Andres Canyon, San Vicente Arroyo from the Mimbres River to Maudes Canyon, Scott Able Canyon and the Sacramento River below Scott Able Canyon. The UAA in SWQB Exhibit 48 provides a list of these waters in Table 1, and a location map in Figure 1. Results of the HP Level 1 evaluations determined that four of these streams are naturally ephemeral:

1. Aqua Chiquita from the Rio Peñasco to McEwan Canyon,
2. Grindstone Canyon from Grindstone Reservoir to headwaters,
3. San Andres Canyon below South San Andres Canyon, and
4. San Vicente Arroyo from the Mimbres River to Maudes Canyon.

SWQB selected a representative reach for each of the six streams to be evaluated. GIS was used to map stream channels; locate permitted wells, diversions and discharges; and to analyze aerial photos, topographic maps, ecoregions, geology, soils and vegetation. The SWQB then conducted a HP Level 1 field evaluation at two sites for each water body, except for Grindstone Canyon above the reservoir. This reach is less than one mile in length and a single

location provided sufficient information. The field evaluations were conducted in 2012 and 2013. Results of each evaluated reach are documented in Appendices A-F of the UAA in SWQB Exhibit 48; signed field evaluation cover sheets are in SWQB Exhibit 49.

The HP Level 1 evaluations determined that two of the evaluated waters are *not* ephemeral throughout and are excluded from this proposal. A portion of Scott Able Canyon was determined to be perennial, and a portion of the Sacramento River below Scott Able Canyon was determined to be intermittent.

B. Sections 20.4.6.403 and .404 NMAC

The basis for the second proposal is the Animas River UAA in SWQB Exhibit 50. The Animas River in New Mexico is currently classified in water quality standards segments 20.6.4.403 and 20.6.4.404 NMAC. Segment 403 contains the lower Animas River from the confluence with the San Juan River upstream to Estes Arroyo in the city of Aztec. This segment currently has two designated aquatic life uses, marginal coldwater and warmwater. Segment 404 contains the upper Animas River from Estes Arroyo upstream to the Southern Ute tribal boundary at the New Mexico state line. This segment has the coldwater designated aquatic life use. Each segment consists of a single assessment unit (AU). A map of the Animas River watershed is provided in Figure 1 of the UAA (SWQB Exhibit 50).

Both of the Animas River AUs are impaired for temperature. A total maximum daily load ("TMDL") study was prepared for the lower Animas River AU to address the temperature impairment. However, the designated coldwater aquatic life use for the upper Animas River AU was considered by SWQB as unattainable due to natural conditions, therefore SWQB conducted a UAA to determine the appropriate attainable aquatic life use. The UAA demonstrated that

coolwater aquatic life is the most protective attainable aquatic life use for the both segments of the Animas River in New Mexico. The coldwater and marginal coldwater aquatic life uses in both segments were determined to be *not attainable* because of the natural water temperatures resulting from ambient air temperatures.

As shown in Figure 1 of SWQB Exhibit 50, the Animas River watershed is contained within the larger San Juan River basin in northwestern New Mexico and southwestern Colorado. The Animas River headwaters are in Colorado. It flows through Colorado and the Southern Ute Indian Tribe ("SUIT") reservation before crossing into New Mexico at an elevation of 6,000 feet. The river continues approximately 37 miles south to its confluence with the San Juan River at an elevation of 5,300 feet. The lower Animas River AU (San Juan River to Estes Arroyo), shown in green, is 16.9 miles long. The upper Animas River AU (Estes Arroyo to the Southern Ute Tribe boundary), shown in blue on Figure 1 in the UAA (SWQB Exhibit 50), is 19.6 miles long.

The ecoregions containing the New Mexico portion of the Animas River watershed are shown in Figure 2 of the UAA (SWQB Exhibit 50). Ecoregions are geographic areas of similar ecosystems characterized by common elevation, air temperature, precipitation, terrain, geology, soils, vegetation and fauna. Ecoregion numbers, such as 20 and 22, are subdivided into more detailed categories with a letter added; for example, 22i. The lower Animas River is located in Ecoregion 22i, the San Juan/Chaco Tablelands and Mesas. Most of the upper Animas River is located in Ecoregion 20c, Semiarid Benchlands and Canyonlands.

Characteristics of these ecoregions are summarized in Table 1 of the UAA (SWQB Exhibit 50). Elevations range from 4800 to 7785 feet. Plateaus, mesas, cliffs and canyons constitute the predominant landforms. Vegetation is predominantly a mix of desert and semi-desert scrub and grassland, with cottonwood and willow in riparian areas. Hydrology is

characterized by mostly intermittent and ephemeral streams with some large rivers, such as the Animas and San Juan, originating in mountainous ecoregions. The natural conditions of these ecoregions are not associated with cold water habitats.

The fish community of a water body is an indicator of habitat elements such as water temperature. Fish species have temperature requirements for various life stages, and assigning precise temperature range is challenging. In general, however, thermal categories can be described as cold, intermediate or cool, and warm. SWQB places fish species into these categories based on scientific consensus, review of the available research, and best professional judgment.

In developing this UAA, SWQB conducted a literature search of fish species documented in the Animas River in or near New Mexico. Table 4 of the UAA in SWQB Exhibit 50 lists these species by general thermal categories, and Table 5 shows the percent relative abundance of fish in each category. Most of the fish species documented have intermediate (cool) thermal preferences. All native fish are intermediate (cool) or warm water species, suggesting that the natural temperatures of the river are intermediate to warm.

Aquatic habitat in the San Juan basin has been impacted by human-caused changes in the water temperature, hydrograph, channel geomorphology, and by the introduction of exotic fish species. One of those impacts is the unnaturally cold water temperatures in the San Juan River downstream of Navajo Dam. This cold water habitat now supports a popular trout fishery, but has displaced native fish species which require warmer water. As native species declined in the mainstem San Juan River, so too did their dispersal into tributaries including the Animas River. The federally listed endangered Colorado pikeminnow and razorback sucker formerly occupied

the Animas River, and roundtail chub has become rare in the Animas and is a candidate for federal listing. The coldwater aquatic life use is not protective of these species.

A small percentage of fish present in the Animas River in New Mexico are cold water fish, mostly brown trout and some rainbow trout. The limited presence of cold water species in an aquatic community dominated by intermediate or cool water species indicates that the habitat is not optimal for cold water species. Brown trout were widely stocked throughout the U.S. in the early 20th century and have become established in many rivers including the Animas. Although it prefers water temperatures less than 20°C, field investigations have reported brown trout occupying water temperature up to 26.3°C. Brown trout spawn in the fall and are not dependent on cold summer temperatures for reproduction. Fish in general are known to seasonally migrate to streams with preferred temperatures. The absence of significant barriers allows trout in the Animas River to migrate north to colder waters that provide more suitable habitat.

Temperature criteria for New Mexico's aquatic life uses are shown in Table 2 of the UAA (SWQB Exhibit 50). TMAX, 4T3 and 6T3 are summary measurements derived from water thermograph datasets. Thermographs are data loggers that can record water or air temperatures continuously at a set interval, usually hourly, over several months. SWQB deploys thermographs in streams throughout the summer, and evaluates the data to identify impairments.

The SUIT has jurisdiction over the Animas River on tribal land, immediately upstream of the New Mexico border. Table 2 of the UAA in SWQB Exhibit 50 includes a crosswalk between the aquatic life uses and criteria for New Mexico and the SUIT. The SUIT's designated use "*Cool water"* TMAX is 24°C, the same as New Mexico's *coldwater* TMAX. The SUIT's designated use "*Warm water"* temperature criterion is >24°C and is therefore similar to New

Mexico's coolwater use. The SUIT plans to propose their designated use of *Warm water* for its section of the Animas River.

SWQB has thermograph data for the Animas River at Farmington, Aztec, Cedar Hill and the state line. The SUIT provided SWQB with thermograph data from less than one mile upstream of the state line. These data were used for evaluating the appropriate water temperature in the upper Animas River AU.

Surface water temperature has been shown as primarily driven by air temperature (Bartholow 2002). SWQB developed a correlation model using air temperature to predict TMAX, 4T3 and 6T3 values for any stream. The model uses July 15 as the date on which the highest annual air temperature typically occurs. SWQB applied the temperature model to six locations along the Animas River. Results are shown in Table 3 of the UAA (SWQB Exhibit 50). Although thermographs did record a few very slight exceedances of 29°C; overall, both observed and predicted water temperatures were more consistent with the coolwater use than the coldwater use.

Low flow and permitted discharges were considered as possible impacts on water temperature. The Animas River TMDL concluded that water temperature in the Animas River is driven mainly by air temperature and solar radiation, and that low flow was not an impairment factor. There are three existing point sources with individual NPDES permits associated with the lower Animas River AU below Estes Arroyo, and none with the upper AU above Estes Arroyo. The City of Farmington Animas Steam Plant withdraws and discharges to Willett Ditch, which leads to the Animas River. The NPDES permit for the steam plant requires that the discharge does not increase the temperature in the Animas River to over 29°C. The City of Aztec Water Treatment Plant discharges to the Lower Animas Ditch, not directly to the Animas River. This

facility is located approximately one mile from the Animas River and its discharge does not affect temperature in the Animas River. The City of Aztec Waste Water Treatment Plant discharges directly to the Animas River. Water temperatures measured at the plant outfall were approximately 25°C, cooler than the receiving water.

IV. PUBLIC PARTICIPATION

A. Section 20.6.4.97 NMAC

As required by Subsection C, 20.6.4.15 NMAC, SWQB released for public comment the draft UAA for these four waters. The draft UAA was posted on the SWQB website on August 14, 2013 and a public notice (SWQB Exhibit 51) was released inviting comment during the 30-day public review period ending on September 13, 2013. SWQB received one comment letter, which was from the New Mexico Mining Association in support of the UAA (SWQB Exhibit 52). The UAA and supporting documents were sent to EPA for technical approval on October 18, 2013. EPA provided technical approval of the UAA on December 19, 2013 (SWQB Exhibit 53). There were no changes to the UAA resulting from the public review.

B. Sections 20.6.4.403 and .404 NMAC

SWQB released a public discussion draft of the Animas River UAA on November 18, 2013. SWQB also released a public notice on November 20, 2013, to announce a 30-day comment period (SWQB Exhibit 54). The draft UAA proposed the coolwater aquatic life use for segment 403 (the lower reach), and the coolwater aquatic life use with a temperature criterion of 27°C for segment 404 (the upper reach). The draft UAA was made available on the SWQB website and an email notification sent to interested parties. A public meeting was held on

December 17, 2013, in Farmington, New Mexico. Four (4) comment letters were received in support of the draft UAA conclusions, and one (1) comment letter was received suggesting different criteria. All written comments and SWQB's responses are provided in SWQB Exhibit 55.

The UAA (SWQB Exhibit 50) demonstrated the coolwater designation as the attainable aquatic life use, with a TMAX criterion of 29°C, instead of a segment-specific 27°C as proposed in the public discussion draft. It was necessary to revise the temperature criterion due to an error discovered in a source table used to calculate the mean July air temperatures presented in the public discussion draft. SWQB corrected the error and reapplied the air-water correlation model. The revised calculations increased the predicted water temperatures by approximately 1.2°C. Therefore, the coolwater default TMAX of 29°C was determined as the more appropriate criterion for the Animas River. This recommendation is a change from the segment-specific TMAX criterion for 20.6.4.403 NMAC in the hearing petition proposal submitted to the WQCC on June 25, 2014. The corrected segment specific TMAX of 29°C as shown in this testimony proposal is the appropriate recommendation for 20.6.4.403 NMAC.

SWQB submitted the final draft UAA for the Animas River segments to EPA for review and technical approval on July 7, 2014. Technical approval was received from EPA on November 3, 2014. EPA's technical approval letter and technical support document are included in SWQB Exhibit 56.

V. CONCLUSIONS

A. Section 20.6.4.97 NMAC

In accordance with the HP UAA process pursuant to Subsection C of 20.6.4.15 NMAC, the SWQB had determined that for the four non-perennial waters listed in the proposal:

- The recreational use that is currently being achieved is that of secondary contact;
- The aquatic life use that is currently being achieved is limited aquatic life;
- The marginal warmwater aquatic life use is impaired by naturally ephemeral conditions; and
- The most protective attainable aquatic life use is limited aquatic life.

The SWQB finds that it is not feasible to attain the designated use of marginal warm water and primary contact because of factor 40 CFR 131.10(g)(2): natural, ephemeral or intermittent or low flow conditions or water levels prevent the attainment of the use.

B. Sections 20.6.4.403 and .403 NMAC

This UAA demonstrates that the natural characteristics of the Animas River in New Mexico support aquatic life habitat that is intermediate between coldwater and warmwater. The UAA concludes that coolwater is the most protective aquatic life use attainable for the lower Animas River *(from the confluence with the San Juan River upstream to Estes Arroyo)* and that coolwater with a segment-specific maximum temperature criterion of 29°C is the most protective aquatic life use attainable for the upper Animas River *(Estes Arroyo to the Southern Ute tribal boundary).* The lower Animas River has two designated aquatic life uses: marginal coldwater and warmwater. Although both marginal coldwater and coolwater have a maximum temperature

criterion of 29°C, these uses describe different habitats. Marginal coldwater refers to habitat that would be coldwater were it not otherwise limited by certain conditions. Coolwater describes habitat that is naturally intermediate between cold and warm. Based on the existing aquatic life described in this UAA, coolwater is the best description of the attainable use. The 6T3 criterion is not applicable to the coolwater aquatic life use.

The coldwater and marginal coldwater aquatic life uses are *not attainable* due to the factor listed in 40 CFR § 131.10 (g)(1):

"Naturally occurring pollutant concentrations prevent the attainment of the use;"

SWQB Exhibit 20. Specifically, thermal pollution (heat) naturally occurring due to ambient air temperatures prevents the attainment of the uses.

Finally, the description for Segment 20.6.4.403 includes a change which adds the word "river". The description for Segment 20.6.4.404 is corrected to reflect the jurisdictional boundary with the SUIT.

The SWQB is petitioning the WQCC to list the four (4) waters that were technically approved by EPA as ephemeral under Subsection C of 20.6.4.97 NMAC and to approve the changes to the segment description, designated uses and associated temperature criteria proposed in Sections 20.6.4.403 and 404 NMAC. Once approved by the WQCC and adopted as standards, the SWQB will submit the revised water quality standards (as will be published in the New Mexico Register) to EPA for formal review and final approval action under CWA § 303(c). This concludes my testimony.